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EXAMINER	
THAKUR, VIREN A	

ART UNIT	PAPER NUMBER
1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,448	WAKAMURA, MASATO	
	Examiner	Art Unit	
	VIREN THAKUR	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the appeal brief filed on November 4, 2008, PROSECUTION IS HEREBY REOPENED. A new grounds of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

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Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See

MPEP § 2172.01. In this case, the claim appears to be missing placing the food into some container. Without this limitation, the claim reads on simply placing food onto a sintered metal modified apatite substance.

Claims 20 and 23 recite the limitation "food preserving article." This limitation is not clear as to what is considered an "article." The specification has not provided any clarity as to the meaning of this limitation and in light of this, the metes and bounds of the claims have not been properly defined.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 23 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Wakamura (JP2000-327315).

It is noted that claim 23 is a product by process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In this case, the product reads on a food preserving article containing a titanium modified calcium hydroxyapatite. Wakamura

discloses articles that are coated with titanium modified calcium hydroxyapatite that can be a sheet or film (paragraph 0017, 0019 and 0020). Regarding claim 25, since Wakamura teaches sheets and films coated with the titanium modified calcium hydroxyapatite, it is noted that these films read on a food preserving article being food wrapping film.

6. **Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Shimazaki (JP 63023744).**

As discussed above the claim is a product by process claim. In light of the rejection under 35 U.S.C. 112, second paragraph regarding the limitation "a food preserving article," it is noted that a catalyst that comprises titanium modified calcium hydroxyapatite that has also been sintered, is considered a food preserving article, especially since the claim does not specify the type of article or how the article preserves the food. For instance, the article can simply be a powder onto which food is placed for preserving.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 15-18,20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn (US5658530) in view of Wakamura (JP2000-327315), Mawatari et al. (US 5614568), Bontinck et al. (US 4367312), Sakurada (JP 11343210) and Sakurada et al. (US 6004667), and in further view of Saito (JP03275627), Hiraide et al. (JP2000-095577), Shimazaki (JP63023744), Sakuma et al. (US 5468489), Atsumi et al. (JP04170960) and Atsumi (JP04217902).

Regarding claim 15, Dunn teaches methods for deactivating biological contaminants and chemical contaminants on the surface of a perishable food product or on the packaging material by passing light through the package (Column 2, Lines 49-61; Column 3, Lines 34-41). The surface of the packaging material or food product is supplemented with titanium dioxide, which when illuminated at specific light frequencies will deactivate contaminants within the package or on the surface of the food product (Column 3, Lines 14-23; Column 4, Lines 59-62). Thus, Dunn teaches applying the anti-microbial composition to the food itself or to the packaging containing the food. Dunn further teaches the inner surface of the container comprising the titanium dioxide

(Column 11, Line 58 to Column 12, Line 30). Dunn teaches applying a photocatalytic material to food containers or directly to foods.

Regarding claim 15, Dunn is silent in teaching the use of Ti complexed with calcium hydroxyapatite and bringing food into contact with the Ti-modified calcium hydroxyapatite.

Wakamura et al. is further evidence that titanium oxide has been well known to be an antimicrobial agent (Paragraph 0002). Wakamura et al. further teach that titanium oxide does not have the properties for adsorbing matter, such as microorganisms on its face and limited oxidative degradation of such microorganisms is achieved using titanium oxide, alone (Paragraph 0002). Wakamura et al. teach that titanium oxide films have limited oxidative degradation function when used on its own and calcium phosphate compounds such as hydroxyapatite tends to lose its adsorption power when adsorption equilibrium is reached (Paragraph 0006). By coprecipitation of the metallic oxide with the hydroxyapatite, Wakamura et al. teach replacing part of Ca with Ti (Paragraph 0010 and Example). The invention of Wakamura et al. teach a combination of the photocatalyst activity of titanium with the adsorption activity of hydroxyapatite that maintains the adsorption power of the calcium phosphate while maintaining the oxidative disassembling properties of the photocatalyst (Paragraph 0002; Paragraph 0006; Paragraph 0007). Wakamura et al. further teach that the metal modified hydroxyapatite can be applied to several “configurations” such as a sheet, a film, a plate, a particle and a tablet (Paragraph 0017). Wakamura et al. teach that the sheet or film can be used to cover one or both sides of a base material (Paragraph

0017). Since Wakamura teaches the advantage of the using Ti-modified calcium hydroxyapatite over only using titanium, to substitute the antimicrobial agent used in Dunn with the titanium modified calcium hydroxyapatite taught by Wakamura et al. would have been obvious to one having ordinary skill in the art for the purpose of improving obtaining both the photocatalytic activity of the titanium with the adsorption activity the calcium hydroxyapatite. Although Dunn already teaches applying an antibacterial agent to food containers and bringing into contact with food, Mawatari et al. has been cited as further evidence that it has been conventional in the art to employ a metal modified calcium hydroxyapatite (column 5, lines 3-6 and column 7, lines 22-49) to articles that come into contact with food, such as kitchenware (column 1, line 17), for its antibacterial properties. Mawatari et al. further teach wherein by supporting the metal ions on the porous substance, the porous structured substance have been subjected to ion-exchange with the metal ions (Column 4, Line 62 to Column 5, Line 2). As a result, the metal supported on the substrate would not be dissolved out by water treatment (Column 7, Lines 43-47) and thus can be applied to the molded article such as the polymeric resin at any amount (Column 7, Lines 47-49). By being able to apply the combination of the hydroxyapatite with the metal ions in any amount, Mawatari et al. solves the problem of providing satisfactory antibacterial activity to styrene resins that was not available in previous methods.

Claim 15 further differs from the combination in sintering the titanium modified calcium hydroxyapatite prior to bringing into contact with food. It is noted however, that Mawatari et al. teaches sintering/heating at 800°C a metal modified calcium

hydroxyapatite for the purpose of ensuring that the bond between the metal (i.e. antibacterial agent) and the calcium hydroxyapatite is further stabilized and strengthened (column 7, lines 40-49). Such a modification ensures that the antibacterial metal component is not dissolved out by any water treatment and therefore allows the metal modified calcium hydroxyapatite to be mixed in any desired amount with additional components, such as a styrene resin (which can be used to make containers and the such). Bontinck et al. is cited as further reference that it was conventional in the art to employ styrene resins (See Abstract) for protecting foodstuffs, pharmaceuticals, cosmetics, toys, tools and similar articles, such as surgical instruments (Column 1, Lines 13-17). Bontinck et al. further teach packages of food products such as biscuits using the packaging film (Column 13, Lines 34-43). Sakurada et al. ‘667 has been cited as further evidence that it was conventional to combine the phototcatalytic activity of titanium with the absorptive properties of calcium hydroxyapatite for the purpose of providing an antimicrobial food packaging film (Column 5, Lines 18-22; Column 6, Lines 10-14 and 55-63; Column 9, Lines 19-26; Column 10, Lines 49-65). Similarly, Sakurada ‘210 also teaches applying the combination of titanium and calcium hydroxyapatite to paper, cloth and plastics that can be used for food packaging (abstract) which prevent the spread of bacteria and minimize the need to carefully clean and wash articles that need to be sterile, since the coating prolongs the sterility of the article (paragraph 0003-0004). It is noted that Sakurada ‘667 teaches melt injection of a complex of titanium and calcium hydroxyapatite and Sakurada ‘210 teaches kneading together the two materials. In

each case, it is not clear as to whether this would result in a titanium modified calcium hydoxyapatite.

Although Mawatari et al. teach a sintering temperature outside of that claimed by applicant, it is noted that the improvement of the antibacterial properties of a metal modified calcium hydroxyapatite as a result of a sintering step has been conventionally performed in the art. For instance, Saito teaches replacing the metal ion on apatite with an antimicrobial metal and then coprecipitating the combination. After filtering and then drying at 110°C for 4 hours, Saito teaches sintering the combination at 600°C. The resulting product has <u>potent antimicrobial activity</u>, is resistant to heat and chemicals and retains its antimicrobial activity when mixed with resins (see "Use/advantage" in abstract). On page 2 of the Japanese publication, Saito also teaches that various antimicrobial metals can be employed, such as silver, copper, zinc, tin, mercury, lead, cadmium to name a few. It is noted that Wakamura teaches using various antimicrobial metals, such as titanium, zirconium or zinc (paragraph 0005). It is further noted that Mawatari et al. also teach that the particular antibacterial metal can be selected from a broad range and can include metals such as silver, zinc, iron, lead and nickel (column 5, lines 3-9). Therefore the metals taught by Wakamura and Saito, who teaches sintering at 600°C, are similar in that they are all antimicrobial acting metals. In addition, both silver and titanium have the similar property of being antimicrobial as well as oxidizing. Hirade also teaches sintering a titanium calcium hydroxyapatite metal complex at up to 600°C which has "biocompatibility and excels in <u>intensity</u> and toughness" (Paragraph 0100). It is not clear as to whether Hirade teaches that the calcium hydroxyapatite is

modified by the titanium metal, but nonetheless teaches that it was conventional to sinter within the claimed range to improve the intensity of the complex. Nevertheless, Shimazaki teaches high catalytic activity of a metal modified calcium hydroxyapatite, which can be modified by metals such as titanium, zirconium, tungsten that is also sintered at 500°C. Although lower than the claimed range, this teaches sintering for the purpose of improving the catalytic activity of metal modified calcium hydroxyapatite. In the case of a titanium modified calcium hydroxyapatite, which the combination as taught above teaches has antimicrobial properties, Shimazaki teaches that drying the modified apatite and then firing at 500° would increase the catalytic activity (i.e. photocatalytic activity of the titanium). Sakuma et al. also teaches metal modified calcium hydroxyapatite which has been sintered at 800°C (column 2, lines 25-49), which then results in a product that is highly stable, low in toxicity (column 1, lines 60-65) and have improved antibacterial properties (abstract). Atsumi '960 and '902 are also cited to further teach another metal modified calcium hydroxyapatite combination that has been sintered with the end result being that the combination has high and durable antibacterial effect without leaching out of the supported metals (see use/advantage). Atsumi '902 also teaches modifying hydroxyapatite with metals such as silver, copper, zinc and nickel and then sintering, with the end result that the agent is effective, safe and will not leach out the metals and metal ions. Nevertheless Atsumi '960 also teaches metal modified hydroxyapatite that has been sintered and thus has improved antimicrobial properties. Therefore, the art taken as a whole teaches that it has been conventional to sinter a metal modified calcium hydroxyapatite. Since, the art taken as

a whole also teaches metals which all have antimicrobial activity which can be sintered at a variety of temperatures such as 500°C, 600°C and 800°C, for the similar purpose of improving the antibacterial/antimicrobial activity of the metal modified calcium hydroxyapatite, as well as the other properties of the metal modified complex such as the improved bonding, the art taken as a whole fairly teaches that particular temperature for sintering the titanium modified calcium hydroxyapatite would have been an obvious result effective variable routinely determinable by experimentation.

Claim 16 further recites the limitation of putting the food in a container that is coated with the sintered titanium modified calcium hydroxyapatite and putting the food in a container made of a material containing the sintered titanium modififed calcium hydroxyapatite. It is noted that Dunn already teaches putting food into a container that is coated with an antibacterial agent. Nevertheless, it would have been obvious to have substituted the titanium dioxide taught by Dunn for the titanium modified calcium hydroxyapatite, as taught by Wakamura for the purpose of achieving the combined photocatalytic effects of the titanium with the absorption properties of the apatite. To sinter the titanium modified hydroxyapatite at between 580-660°C prior to bringing into contact with the food would also have been obvious since the art taken as a whole teaches sintering, even within applicant's claimed range, for the purpose of improving the antibacterial properties of the metal modified apatite, which is also what applicant is achieving by sintering. Regarding instant claims 16 modified Dunn teaches containers having an inner surface coated with sintered titanium modified hydroxyapatite, into which food is placed.

Claim 17 is similar to claim 16 except that instead of a container, the food is wrapped in a wrapping film coated with the metal modified calcium hydroxyapatite. Wakamura et al. also teach wherein the substrate can be a sheet or film (paragraph 0017, 0019 and 0020). Bontinck et al. further teach packages for food products such as biscuits using styrene resin comprising packaging film (Column 13, Lines 34-43). Mawatari et al. teaches styrene resin composition comprising metal modified apatite, for its antibacterial properties. Nevertheless, since these films are also made of styrene resins it would have been obvious to one having ordinary skill in the art to apply the titanium bonded with the hydroxyapatite, as taught by modified Dunn for the purpose of preventing contamination of the foodstuffs and the pharmaceuticals that have been wrapped in the film. The art taken as a whole thus teaches that it was conventional to coat various food packaging articles with a titanium modified calcium hydroxyapatite for the purpose of protecting the contents therein. The particular conventional packaging material, such as a container or wrapping film, to which the titanium modified calcium hydroxyapatite was applied would nonetheless have been an obvious matter of choice and/or design.

Claim 20 recites a food preserving article comprising a substantially surrounding barrier having an inner surface coated with sintered titanium modified calcium hydroxyapatite. It is noted that the article need not contain the food but must only contact and surround food. In any case, the combination, as applied above teaches containers coated with sintered titanium modified calcium hydroxyapatite into which food is placed, for preventing bacterial growth on the food. This reads on claim 20 and

claim 21, which recites a food container. Regarding claim 22, as discussed above with respect to the packaging film, it is noted that the combination already teaches a wrapping film as a food preserving article. Claim 23 is rejected for the reasons given above with respect to claim 15. Claim 24 and 25 is rejected for the reasons given above with respect to claims 16, 17, 21 and 22. Regarding claim 23, it is noted that the claim is a product by process claim. In light of the rejection under 35 U.S.C. 102(b), as discussed above, it is noted that the combination, as applied to claims 15-18 and 20-22 already teach that it would have been obvious to sinter titanium modified calcium hydroxyapatite, even within the claimed range, for the purpose of improving the antimicrobial activity of the substance. Claims 24-25 are rejected for the reasons given above with respect to claims 16-17 and 21-22.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-17 and 20-25, above in paragraph 9, and in further view of Sakuma et al. (US 5468489).

Claim 18 differs from the combination as applied above in reciting applying the calcium hydroxyapatite to the surface of the food or adding the sintered titanium modified calcium hydroxyapatite to the food. It is noted that <u>applying to</u> the surface of the food reads on <u>adding</u> the sintered titanium modified calcium hydroxyapatite <u>to</u> the food. In any case, Dunn teaches that the antibacterial agent can be applied to the food or to the food packaging. It is further noted that Sakuma et al. also teach sintered metal modified calcium hydroxyapatite which has been included into toothpaste (see abstract).

Therefore the art taken as a whole teaches that it was conventional in the art to include titanium modified calcium hydroxyapatite and metal modified calcium hydroxyapatites to food and to thus add sintered titanium modified calcium hydroxyapatite to food would have been obvious to one having ordinary skill in the art for the purpose of preventing the growth of bacteria on the food or in the food.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-17 and 20-25, above in paragraph 9, and in further view of Okamoto (JP 2000-051041).

Claim 19 recites bringing the food into contact with tableware surface coated with sintered titanium modififed calcium hydroxyapatite. Okamoto teaches tableware, such as a drinking cup that comprises a photocatalyst for the purpose of removing odor and dirt from the inner portions of the tableware. Thus, Okamoto teaches providing similar photocatalytic activity to the surfaces of tableware for the purpose of preventing dirt and odors that collect on the inner surface from affecting the taste of the food. In addition, Mawatari et al. teaches coating kitchenware with sintered metal modified calcium hydroxyapatite for the similar purpose of preventing bacterial growth.

In view of the art taken as a whole, to therefore place food onto tableware or kitchenware that has also been coated with sintered titanium modified calcium hydroxyapatite would thus have been an obvious matter of choice and/or design, especially since the combination already teaches placing food into a container or wrapping food comprising sintered titanium modified calcium hydroxyapatite. As

discussed above, once it was known in the art to coat kitchenware, containers and other articles with sintered titanium modified calcium hydroxyapatite, the particular article coated would have been an obvious matter of choice and/or design.

12. Claims 15-17 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakamura (JP 2000327315) in view of Saito (JP03275627), Hiraide et al. (JP2000-095577), Shimazaki (JP63023744), Atsumi et al. (JP04170960) and Atsumi (JP04217902) and in further view of Dunn (US5658530), Mawatari et al. (US 5614568), Bontinck et al. (US 4367312), Sakurada (JP 11343210) and Sakurada et al. (US 6004667).

Regarding claim 15, Wakamura teaches a titanium modified calcium hydroxyapatite, which provides both the antimicrobial (photocatalytic) effects of the titanium in combination the adsorbing properties of calcium hydroxyapatite. Wakamura teaches that this combination is improved over titanium alone which has limited photocatylitic (oxidation) functionality, by modifying calcium hydroxyapatite with a metal such as titanium. Wakamura teaches a combination can absorb organic substances and also employ the antimicrobial / photocatlyitic activity of the metal. The claim differs from Wakamura in specifically reciting sintering the titanium modified calcium hydroxyapatite at between 580°C to 660°C.

Saito has been relied on as discussed above to teach that it was conventional in the art to sinter at 600°C hydroxyapatite having elements replaced by an antimicrobial metal, for the purpose of obtaining a composition having potent antimicrobial activity

and that retains its antimicrobial activity when mixed with resins. Saito also teaches various antimicrobial metals that can be employed, such as silver, copper and zinc. Shimazaki teaches calcium hydroxyapatite modified with a metal such as titanium and which has been sintered at 500°C has high catalytic activity. Hiraide et al. has also been relied on as discussed above to teach sintering at 600°C to increase the potentcy of a titanium calcium hydroxyapatite complex. Sakuma et al., Atsumi '960 and '902 are also cited to further teach another metal modified calcium hydroxyapatite combination that has been sintered with the end result being that the combination has high and durable antibacterial effect without leaching out of the supported metals, as discussed above. The art taken as a whole clearly teaches that it was conventional in the art to sinter a metal modified calcium hydroxyapatite for the purpose of improving its catalytic and/or antimicrobial activity. Saito even teaches a sintering temperature within applicant's claimed range. Therefore, the particular temperature for sintering would have been an obvious result effective variable to one having ordinary skill in the art, since the art taken as a whole teaches sintering for improving antimicrobial/catalytic activity of metal modified calcium hydroxyapatite compounds.

Regarding the particular metal, it is noted that Wakamura teaches using various antimicrobial metals, such as titanium, zirconium or zinc (paragraph 0005). It is further noted that Mawatari et al. also teach that the particular antibacterial metal can be selected from a broad range and can include metals such as silver, zinc, iron, lead and nickel (column 5, lines 3-9). Therefore the metals taught by Wakamura and Saito, who teaches sintering at 600°C, are similar in that they are all antimicrobial acting metals. In

addition, both silver and titanium have the similar property of being antimicrobial as well as oxidizing.

The claim further differs from the combination in bring food into contact with the sintered titanium modified calcium hydroxyapatite. It is noted that Dunn already teaches a container coated with an antimicrobial agent, such as titanium, into which food is placed (i.e. bringing food into contact with the antimicrobial agent). Since Wakamura teaches improved properties of the titanium modified calcium hydroxyapatite, as discussed above over the photocatalytic/antimicrobial titanium alone, to coat a container for preserving food with the sintered titanium modified calcium hydroxyapatite as taught by the combination, would have been obvious to one having ordinary skill in the art, for the purpose of improving the antimicrobial activity of the coating used to preserve the food. It is noted that Mawatari et al., Bontinck et al., Sakurada '210 and Sakurada et al. '667 have been relied on as discussed above to teach that it was conventional to combine a metal such as silver or titanium with calcium hydroxyapatite and coat containers and films into which food is placed, for the purpose of preserving the food.

Therefore, in regards to claim 16, which recites placing food into a container coated with sintered titanium modified calcium hydroxyapatite, the combination, as applied above already teaches placing food into a container. Regarding claim 17, Mawatari et al. teaches kitchenware made from styrene resins that comprise metal modified calcium hydroxyapatite, with the apatite coating employed for its antimicrobial properties. Bontinck et al. teaches that it was conventional in the art to employ styrene resin materials for food packaging. Sakruada '210 and Sakurada '667 teach that it was

conventional to combine the phototcatalytic activity of titanium with the absorptive properties of calcium hydroxyapatite for the purpose of providing an antimicrobial food packaging film, as discussed in the rejection above. Once it was obvious to one having ordinary skill in the art to coat a container with a sintered titanium modified calcium hydroxyapatite material for the purpose of preserving the food placed therein, the particular conventional food packaging material to be coated and then into which food is placed would have been an obvious matter of choice and/or design.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-17 and 20-25, above in paragraph 14, and in further view of Sakuma et al. (US 5468489). The claim is rejected for the reasons given above in paragraph 10.

14. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-17 and 20-25, above in paragraph 14, and in further view of Okamoto (JP 2000-051041). The claim is rejected for the reasons given above in paragraph 11.

Response to Arguments

15. In the appeal brief, filed November 4, 2008, appellant urges that the combination of references do not teach the sintering of the titanium modified calcium hydroxyapatite

at between 580°C-660°C. It is noted that the newly applied references teach the concept of sintering a metal modified calcium hydroxyapatite for the purpose of increasing the antibacterial activity of the substance, and further teach sintering a titanium modified calcium hydroxyapatite at 600°C for the purpose of improving the catalytic activity of the substance.

16. In light of the number of references relied on, it is noted that, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). In this case, the secondary references have been relied on to provide clear evidence that the art taken as a whole recognized the concept of sintering metal modified calcium hydroxyapatite substances for the purpose of increasing catalytic activity and for increasing the antimicrobial activity of the substance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIREN THAKUR whose telephone number is (571)272-6694. The examiner can normally be reached on Monday through Friday from 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571)-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Steve Weinstein/
Primary Examiner, Art Unit 1794

/V. T./
Examiner, Art Unit 1794

/JENNIFER MCNEIL/
Supervisory Patent Examiner, Art Unit 1794